



## UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

|   |             |                         |                      |                  |
|---|-------------|-------------------------|----------------------|------------------|
| APPLICATION NO.                           | FILING DATE | FIRST NAMED INVENTOR    | ATTORNEY DOCKET NO.  | CONFIRMATION NO. |
| 10/729,478                                | 12/05/2003  | Sivaram Balasubramanian | 99AB083-A (1506.094) | 3088             |
| 63122                                     | 7590        | 12/21/2009              | EXAMINER             |                  |
| ROCKWELL AUTOMATION, INC./BF <sup>7</sup> |             |                         | ZHE, MENG YAO        |                  |
| ATTENTION: SUSAN M. DONAHUE, E-7F19       |             |                         | ART UNIT             | PAPER NUMBER     |
| 1201 SOUTH SECOND STREET                  |             |                         |                      | 2195             |
| MILWAUKEE, WI 53204                       |             |                         |                      |                  |
| NOTIFICATION DATE                         |             | DELIVERY MODE           |                      |                  |
| 12/21/2009                                |             | ELECTRONIC              |                      |                  |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@boylefred.com  
smdonahue@ra.rockwell.com

|                              |                                      |   |
|------------------------------|--------------------------------------|---|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/729,478 | <b>Applicant(s)</b><br>BALASUBRAMANIAN, SIVARAM |
|                              | <b>Examiner</b><br>MENGYAO ZHE       | <b>Art Unit</b><br>2195                         |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 16 October 2009.

2a) This action is FINAL.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 24,26-29 and 31-34 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 24, 26-29, 31-34 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_

5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_

**DETAILED ACTION**

1. Claims 24, 26-29, 31-34 are presented for examination.

***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/16/2009 has been entered.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 24, 26-29, 31-34 rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al., International Publication No. WO 98/42101 (hereafter Smith) in view of Zweben et al., Patent No. 6,216,109 (hereafter Zweben).
4. Smith and Zweben were cited in the previous office action.

5. As per claim 24, Smith teaches a method of coordinating a new control application program with other control application programs being performed on a distributed operating system (Pg 2, lines 1-6), wherein the distributed operating system is for use with a control system having spatially separated control hardware nodes, each node having at least one resource, and the control system further including a network connecting a plurality of hardware nodes (Pg 12, lines 20-25), the method comprising:
  - executing the operating system on at least one processor of the hardware nodes (Pg 18, lines 7-18);
    - managing at least one resource from at least a first and second, spatially separated control hardware node with the operating system (Pg 17, lines 10-12, 20-27);
      - receiving the new control application program to be registered with the operating system (Fig 2, unit 11; Pg 14, lines 22-27);
        - matching control hardware resources required by the new control application program from a resource list to resources on at least the first and the second spatially separated control hardware nodes (Pg 14, line 17-Pg 15, line 9; Table 1);
          - allocating portions of a constraint associated with the new control application program to each identified control hardware resource (Pg 18, lines 19-25);
            - determining whether the allocated portions of the constraint of the new control application program can be met while requirements of the other control application programs also are met (Pg 17, lines 20-27).
              - allocating the new control application program to the identified control hardware resources (Pg 21, lines 6-18).

Smith does not specifically teach that the operating system is a real-time operating system.

However, since Smith never limits his operating system to be anything specific, and furthermore since real-time operating system are commonly used to minimize latency, it would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Smith with a real-time operating system for the purpose of latency minimization.

Although Smith teaches that resources could be time resources (Column 12, line 1, Pg 15, lines 19-21), Smith does not specifically teach in details that the method further comprises identifying a fixed time interval associated with the new control application program for completing execution of at least a portion of the new control application program, and executing within the portion of the fixed time interval allocated to each identified control hardware resource.

However, Zweben teaches identifying a fixed time interval associated with a task for completing execution of at least a portion of the new task, and executing within the portion of the fixed time interval allocated to each identified control hardware resource for the purpose of meeting time constraints of tasks (Column 16, lines 39-57).

It would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Smith where the application control program needs time resources with the specifics of identifying a fixed time interval associated with a task for completing execution of at least a portion of the new task, and executing within the portion of the fixed time interval allocated to each identified control

hardware resource for the purpose of meeting time constraints of tasks, as taught by Zweber, such that the task is actually the execution of the application control program that has specific timing requirements, because this allows the system to best satisfy a task's timing needs.

6. As per claim 26, Smith teaches collecting statistics regarding a usage of the control hardware resources as the new control application program and other control application programs are being performed; and optimizing the usage of the control hardware resources based at least in part upon the collected statistics (Pg 39, line 21-Pg 41, line 5).

7. As per claim 27, Smith teaches a method of operating an application program on a distributed control system having a plurality of hardware resources, the method comprising: executing the operating system on at least one processor of the hardware nodes (Pg 18, lines 7-18);

managing at least one resource from at least a first and second, spatially separated control hardware node with the operating system (Pg 17, lines 10-12, 20-27);

receiving high-level requirements concerning the application program (Pg 14, lines 22-27); determining low-level requirements based upon the high-level requirements (Pg 15, lines 15-24); allocating at least one of the high-level requirements and the low-level requirements among at least some of the plurality of hardware resources (Pg 18, lines 19-25); operating the application program in accordance with the allocated requirements (Pg 18, lines 19-25).

Smith does not specifically teach that the operating system is a real-time operating system.

However, since Smith never limits his operating system to be anything specific, and furthermore since real-time operating system are commonly used to minimize latency, it would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Smith with a real-time operating system for the purpose of latency minimization.

Zweben teaches identifying a fixed time interval associated with a task for completing execution of at least a portion of the new task, and executing within the portion of the fixed time interval allocated to each identified control hardware resource for the purpose of meeting time constraints of tasks (Column 16, lines 39-57).

8. As per claim 28, Smith teaches wherein the high-level requirements include at least one of a hardware requirement, a completion-timing constraint, a message size, an inter-arrival period, a need for remote system services, and a type of priority (Pg 15, lines 19-21; Pg 41, line 20) and wherein the low-level requirements include at least one of an amount of memory, a network bandwidth, and a processor bandwidth (Tables 1, 2).

9. As per claim 29, Smith teaches wherein the allocating of the low-level requirements includes allocating the low-level requirements to both a primary hardware

resource and an implicit hardware resource (Pg 5, lines 2-7; Table 1: network connection bandwidth corresponds to primary hardware resource and microphone corresponds to implicit hardware resource).

10. As per claim 31, Smith teaches wherein the control hardware resources include multiple nodes and each node includes a memory device, a processor and a communication means (Pg 16, lines 5-11).

11. As per claim 32, Smith teaches wherein the new control application program is allocated to a plurality of nodes (Pg 16, line 24-Pg 17, line 12).

12. As per claims 33, 34, Smith in view of Zweben does not specifically teach wherein the fixed completion time requirement is based on the high-level and low-level requirements. However, since requirement levels are commonly practiced in the field of service quality insurance (Qos) at the time of the applicant's invention for the purpose of specifying different importance level for the requirement, it would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to specify requirement levels such that wherein the fixed completion time requirement is based on the high-level and low-level requirements, because this ensures that some of the most important requirements may be met when it is impossible to meet all requirements.

***Response to Arguments***

13. Applicant's arguments filed on 10/16/2009 have been fully considered but are not persuasive.
  
14. In the remark, the applicant argued that:
  - i) Smith does not teach managing at least one resource from at least a first and second, spatially separated control hardware node with the operating system
  - ii) Smith does not teach matching control hardware resources required by the new control application program from a resource list to resources on at least the first and the second spatially separated control hardware nodes The Examiner respectfully disagree with the applicant. As to point:
    - i) Smith teaches a configuration engine that may reside in a terminal, where a terminal comprises an operating system. The configuration engine is capable of matching resources required by the application to available resources (Pg 17, lines 10-12, 20-27). Although in on method, the terminal is responsible for resource management, Smith did include this second embodiment to specify that the configuration engine may also be responsible for resource management.
    - ii) The application profile that lists application requirement corresponds to the resource list, which is taught by Smith on Pg 14, line 17-Pg 15, line 9; Table 1.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MENGYAO ZHE whose telephone number is (571)272-

Art Unit: 2195

6946. The examiner can normally be reached on Monday Through Friday, 7:30 - 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Meng-Ai An/  
Supervisory Patent Examiner, Art Unit 2195

/Meng Yao Zhe/